

# Claims

[c1] What is claimed is:

1.A lubrication system for an engine comprising:  
an engine arranged to receive consumable lubricating oil;  
an oil reservoir mounted in close proximity to the engine; and  
a pump disposed within the oil reservoir.

[c2] 2.The lubrication system of claim 1 wherein the pump is a permanent magnet reciprocating pump.

[c3] 3.The lubrication system of claim 1 wherein the pump is a solenoid driven pump.

[c4] 4.The lubrication system of claim 3 wherein the solenoid driven pump is in electrical communication with an ECU and is driven by a PWM signal.

[c5] 5.The lubrication system of claim 1 further comprising an oil manifold mounted to an outlet of the reservoir in fluid communication with the pump and configured to distribute oil to the outboard motor.

[c6] 6.The lubrication system of claim 1 further comprising a

locator positioned in an outlet of the reservoir and constructed to facilitate installation of the pump.

[c7] 7.The lubrication system of claim 1 further comprising a float dependently disposed from the pump in the oil reservoir and configured to indicate oil level in the oil reservoir.

[c8] 8.The lubrication system of claim 7 wherein the float is electrically connected to an ECU and wherein, if the float indicates an oil level below a predetermined level, the ECU controls the engine in a limp-home mode.

[c9] 9.The lubrication system of claim 1 further comprising:  
an ECU; and  
a pressure switch connected to an outlet of the pump and to the ECU to indicate oil pressure from the pump.

[c10] 10.The lubrication system of claim 1 wherein the oil reservoir is a sole source of oil in the lubrication system.

[c11] 11.The lubrication system of claim 1 wherein the pump further comprises:  
a drive section and a pump section; and  
a drive assembly disposed in the drive section, the drive assembly including at least one permanent magnet and a coil assembly disposed within the magnetic field of the at least one permanent magnet, the coil assembly mov-

able reciprocally axially along a central axis upon application of power to the coil assembly.

- [c12] 12. An outboard motor comprising:
  - a two-stroke direct fuel injected engine mounted on a midsection of an outboard motor;
  - a housing cover positioned about the engine;
  - an oil tank positioned in the housing; and
  - a pump disposed within the oil tank and in fluid communication with the engine.
- [c13] 13. The outboard motor of claim 12 further comprising a tube connected to an inlet of the pump and extending into a lower end of the oil tank.
- [c14] 14. The outboard motor of claim 13 further comprising a float slidably engaged to the tube and constructed to indicate a level of oil in the oil tank.
- [c15] 15. The outboard motor of claim 12 further comprising:
  - a manifold connected to receive oil from the oil tank and in fluid communication with the engine; and
  - a pressure switch connected to the manifold to monitor oil pressure to the engine.
- [c16] 16. The outboard motor of claim 12 further comprising:
  - a plurality of oil lines extending from the oil tank to the engine; and

an oil line shield constructed to secure a portion of the plurality of oil lines to prevent the plurality of oil lines from rubbing against the engine during motor operation.

[c17] 17.The outboard motor of claim 12 wherein the oil tank is constructed of two molded halves, joined by a weld, and wherein one halve has two openings at an upper end, one of the openings to threadedly receive a sealing cap thereon to fill the oil tank.

[c18] 18.The outboard motor of claim 17 wherein the oil tank is generally L-shaped having a longitudinal section and a lateral section and wherein the lateral section has a filler opening therein.

[c19] 19.The outboard motor of claim 12 wherein the pump is mounted to a distribution manifold at one end and a float at another end to form a one-piece assembly insertable into the oil tank.

[c20] 20.The outboard motor of claim 19 wherein the one-piece assembly includes a pliable seal at an upper end to engage an opening in the oil tank and provide an oil seal therebetween.

[c21] 21.The outboard motor of claim 20 wherein the one-piece assembly further comprises a plurality of wires extending outwardly from the pliable seal.

- [c22] 22.The outboard motor of claim 19 further comprising an opening in the oil tank having a diameter that is greater than an outer diameter of the one-piece assembly.
- [c23] 23.The outboard motor of claim 12 wherein the oil tank is sized according to engine size and wherein the oil tank is capable of holding an average year's supply of oil.
- [c24] 24.The outboard motor of claim 12 wherein the oil tank has a .02 Liter/HP to .05 Liter/HP capacity.
- [c25] 25.The outboard motor of claim 12 further comprising an oil distribution hub having an inlet in fluid communication with the pump and having a plurality of outlets, at least one outlet fluidly connected to the engine.
- [c26] 26.The outboard motor of claim 25 wherein the plurality of outlets are quick connects.
- [c27] 27.The outboard motor of claim 12 wherein the engine and the housing form a cavity constructed to receive the oil tank therein.
- [c28] 28.The outboard motor of claim 12 wherein the oil tank is a sole oil source.

- [c29] 29.The outboard motor of claim 12 wherein the pump further comprises:  
a drive section and a pump section; and  
a drive assembly disposed in the drive section, the drive assembly including at least one permanent magnet and a coil assembly disposed within the magnetic field of the at least one permanent magnet, the coil assembly movable reciprocally axially along a central axis upon application of power to the coil assembly.
- [c30] 30.An outboard motor comprising:  
an engine disposed within a housing of an outboard motor and forming a cavity between a portion of the engine and the housing;  
an oil container disposed in the cavity between the engine and the housing; and  
a pump enclosed in the oil container.
- [c31] 31.The outboard motor of claim 30 wherein the oil container has a lateral portion and a vertical portion.
- [c32] 32.The outboard motor of claim 31 wherein each portion of the oil container has an opening.
- [c33] 33.The outboard motor of claim 31 wherein the vertical portion further comprises a pair of bosses vertically offset from one another for mounting the oil container to

the engine.

- [c34] 34.The outboard motor of claim 33 wherein the vertical portion further comprises another boss horizontally offset from the pair of bosses for mounting the oil container to the engine.
- [c35] 35.The outboard motor of claim 31 wherein a depth of the vertical portion is greater than a length of the lateral portion.
- [c36] 36.The outboard motor of claim 30 wherein the oil container has a shape that substantially matches a shape of the cavity.
- [c37] 37.The outboard motor of claim 30 further comprising at least one boss integrally formed with the oil container and configured to secure the oil container to the engine.
- [c38] 38.The outboard motor of claim 30 wherein a pressure switch and a float are enclosed in the oil container.
- [c39] 39.The outboard motor of claim 30 wherein the oil container is a sole source of oil.
- [c40] 40.The outboard motor of claim 30 wherein the pump further comprises:  
a drive section and a pump section; and  
a drive assembly disposed in the drive section, the drive

assembly including at least one permanent magnet and a coil assembly disposed within the magnetic field of the at least one permanent magnet, the coil assembly movable reciprocally axially along a central axis upon application of power to the coil assembly.